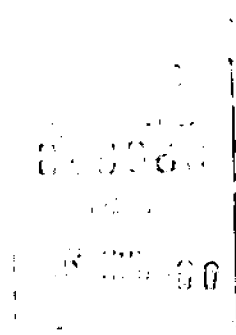


**DESIGN AND FABRICATION OF
CEILING FAN BLADES CLEANER**

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**This report submitted in partial fulfillment of the
requirement for the award of the diploma
of Mechanical Engineering.**



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ABSTRAK

Tesis ini membentangkan penyelidikan dalam menghasilkan sebuah alat untuk dijadikan pencuci bilah kipas siling. Objektif tesis ini adalah untuk menghasilkan sebuah pencuci bilah kipas siling yang mudah dibawa, serba guna dan juga ergonomik selain mudah dan senang untuk dikendalikan. Bahan seperti span dan plastik yang digunakan adalah mudah didapati dalam industri. Permodelan struktur pejal tiga-dimensi bagi pencuci bilah kipas siling ini dibangunkan dengan perisian Solidwork. Keputusan yang diperolahi membuktikan kedua-dua permukaan bilah kipas siling ini dapat dibersihkan dengan menggunakan span. Habuk dan sarang lelabah yang terdapat pada permukaan bilah kipas jatuh terus ke dalam kotak takungan habuk yg disediakan. Keputusan penilaian produk ini amat bermakna bagi memperbaiki reka bentuk produk diawal tahap pembangunan. Keputusan juga berupaya menurunkan kos dan masa ke pasaran, memperbaiki kepercayaan produk dan keyakinan pelanggan.

ABSTRACT

This project presents finite element based durability assessment for a new ceiling fan blade cleaner. The objectives of this project are to create a portable, versatile and ergonomic ceiling fan blade cleaner and to create equipment that easy to operate. Sponge and plastic material were studied in this thesis which commonly used in industry. The structural three-dimensional solid modelling of ceiling fan cleaner was developed using the solid work software. The acquired result present both of ceiling fan blades surface is cleaned when used sponge. The dust and cobwebs from blade is free to fall into the dust-box. The durability assessment results are significant to improve the component design at the early developing stage. The results can also significantly reduce the cost and time to market, and improve product reliability and customer confidence.

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CHAPTER 1

INTRODUCTION

1.1: General Objective

Diploma final year project objective is to practice the knowledge and skill of the student that have been gathered before in solving problem using academic research, to born an engineer that have enough knowledge and skill.

This project important to improve the component design at the early developing stage. The project at another way will educate the student in communication skills like in a presentation and educate them to defend their research in the presentation.

The project also will generate students that have capability to make a good research report in thesis form or technical writing.

This project otherwise can produce and train student to capable of doing work with minimal supervisory and more independent in searching, detailing and expanding the knowledge and experiences.

1.1.1 : Specific Project Objective

Basically this project is base on this objective:

- To create a portable, versatile and ergonomic ceiling fan blade cleaner.
- To create equipment that easy to operate.
- To reduce the movement and other additional equipments.

1.2: Problem Statements

Nowadays, all the residential houses equip with the blade fan. Because of the design and the way they reduce the hot temperature, this fan blade installed at the top of the house or at the ceiling.

Because the high of this fan blade from the floor make it difficult to clean without using the additional equipment like steel stairs. The fan blade cleaner developed to solve this problem where it will helps user to make sure they can clean all the dirt at the fan.

Such cleaners have generally been of a finite length, covering only a portion of the blade length at any given point in the cleaning process with resultant displacement of the dust as the cleaner is run over the blade. The dust is free to fall from the blade surface and since it usually is oily in nature it will readily fall and contaminate the floors or other surfaces below the ceiling fan.

1.2.1 : Specific Problem Statements

Basically this project is base on these problem statements:

- No other equipment that can clean the ceiling fan blade without using additional equipment.
- The high of the ceiling may make the work difficult and not ergonomic.

1.3 : Scope

- ▶ To design and fabricate fan blade cleaner that the 6 foot, twist-and-lock handle and rectangular-shaped dusting head with sponge and dust-box.
- ▶ To design and fabricate fan blade cleaner that use sponge.
- ▶ To design and fabricate fan blade cleaner that can trapped dust into dust-box.

1.4 : Background

A ceiling fan blade cleaner use for cleaning a blade of a ceiling fan. The purposes of this project are to create a portable, versatile and ergonomic ceiling fan blade cleaner and to create equipment that easy to operate. Because the high of this fan blade from the floor make it difficult to clean without using the additional equipment like steel stairs. The fan blade cleaner developed to solve this problem where it will helps user to make sure they can clean all the dirt at the fan. Such cleaners have generally been of a finite length, covering only a portion of the blade length at any given point in the cleaning process with resultant displacement of the dust as the cleaner is run over the blade. The dust is free to fall from the blade

surface and since it usually is oily in nature it will readily fall and contaminate the floors or other surfaces below the ceiling fan.

In this respect, the ceiling fan blade cleaner according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in so doing provides an apparatus primarily developed for the purpose of both cleaning and trapping the oily dirt and grease from the surface of ceiling fan blades.

Therefore, it can be appreciated that there exists a continuing need for new and improved fan blade cleaner which can be utilized to also trap removed dirt. In this regard, the present invention substantially fulfills this need.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will cover the summarizing of all the literature review gathered from many academic resources.

2.2 Pre Review

Nowadays, all the residential houses equip with the blade fan. Because of the design and the way they reduce the hot temperature, this fan blade installed at the top of the house or at the ceiling.

Because the high of this fan blade from the floor make it difficult to clean without using the additional equipment like steel stairs. The fan blade cleaner developed to solve this problem where it will helps user to make sure they can clean all the dirt at the fan.

Such cleaners have generally been of a finite length, covering only a portion of the blade length at any given point in the cleaning process with resultant displacement of the dust as the cleaner is run over the blade. The dust is free to fall from the blade surface and since it usually is oily in nature it will readily fall and contaminate the floors or other surfaces below the ceiling fan.

2.3: Review Current Design

2.3.1: Ceiling Fan Cleaner



Figure 2.1: Ceiling fan cleaner

Product Information

Reaching the tops of dust-covered ceiling fans is easy with the 5 foot, adjustable telescoping, twist-and-lock handle and oval-shaped dusting head design. Simply put the fan blade in the middle of the dusting head and in one quick motion, the split-tip fibers clean the top and bottom of the blade. The split-tip poly fibers grab the finest dust particles and cobwebs leaving the surface clean. The handle comes complete with a swivel-tip grip for off-the-floor storage. 5-year limited warranty.

Product Features

- poly fibers with split tips for excellent dust pickup.
- 5 foot telescoping, twist-and-lock handle.
- swivel-tip grip.

2.3.2: Flexible Static Duster

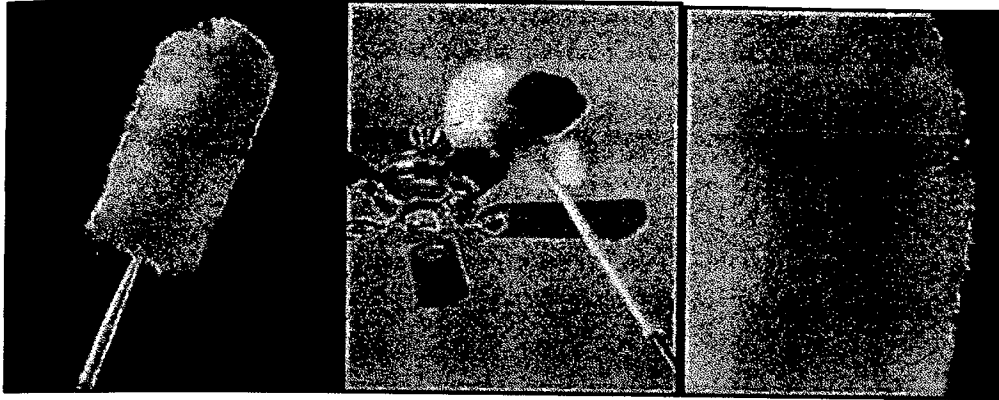


Figure 2.2: Flexible static duster

Product Information

Our Flexible Static Duster makes dusting quick and easy. The abundant electrostatic fibers attract dust like a magnet and the flexible head is perfect for dusting ceiling fans, along ledges, chandeliers and other hard-to-reach places. It's not even necessary to move the object; just dust around it. And the handle extends to 60" so nothing is out of reach. Or remove the head from the handle to use as a tabletop duster. 5-year limited warranty.

5

Product Features

- Fibers attract and hold onto dust.
- Flexible head bends to dust ceiling fans and other hard-to-reach places.
- Just twist the handle to adjust to any length up to 60".

2.3.3: Ceiling Fan Vacuum.

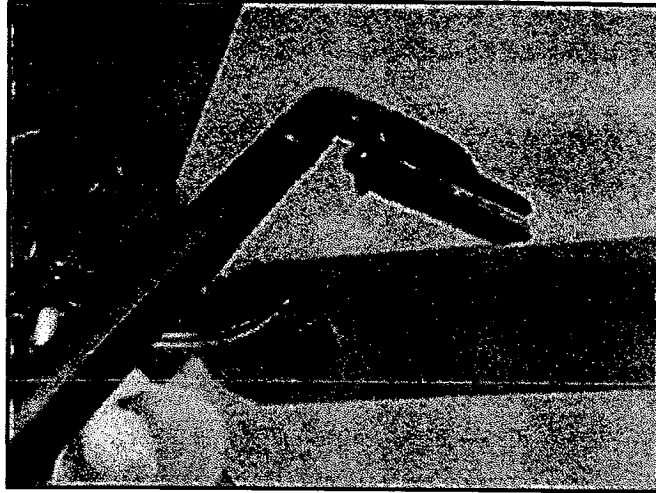


Figure 2.3 : Ceiling fan vacuum

Product Information

Ceiling fan blades collect lots of dust, and then they spread it around. This vacuum attachment makes cleaning your fan blades easy. Powerful vacuum "fingers" open and close around the fan blade, removing dust for good. You won't have to stand on a chair to clean. Attaches to most major vacuums. Actual color may vary. Fits all major brand vacuums, Includes adapter and adjustable angle brush.

2.3.4: Squeegee Cleaner.



Figure 2.4 : Squeegee cleaner

Product Information

Squeegee cleaner makes cleaning quick and easy. The sponge attract dust and cobweb and it perfect for cleaning ceiling fan blades and other hard-t-reach places. In one quick motion, the squeegee cleaner, clean the surface of the blades.

CHAPTER 3

METHODOLOGY

3.1: Introduction

This chapter will cover all the process planning, from start choose project title, searching information, making design, fabricate and until write a final report. Beside that, this chapter also describes all the steps in making this project success. Furthermore, project planning also important to this project is working.

3.2: Flow Chart

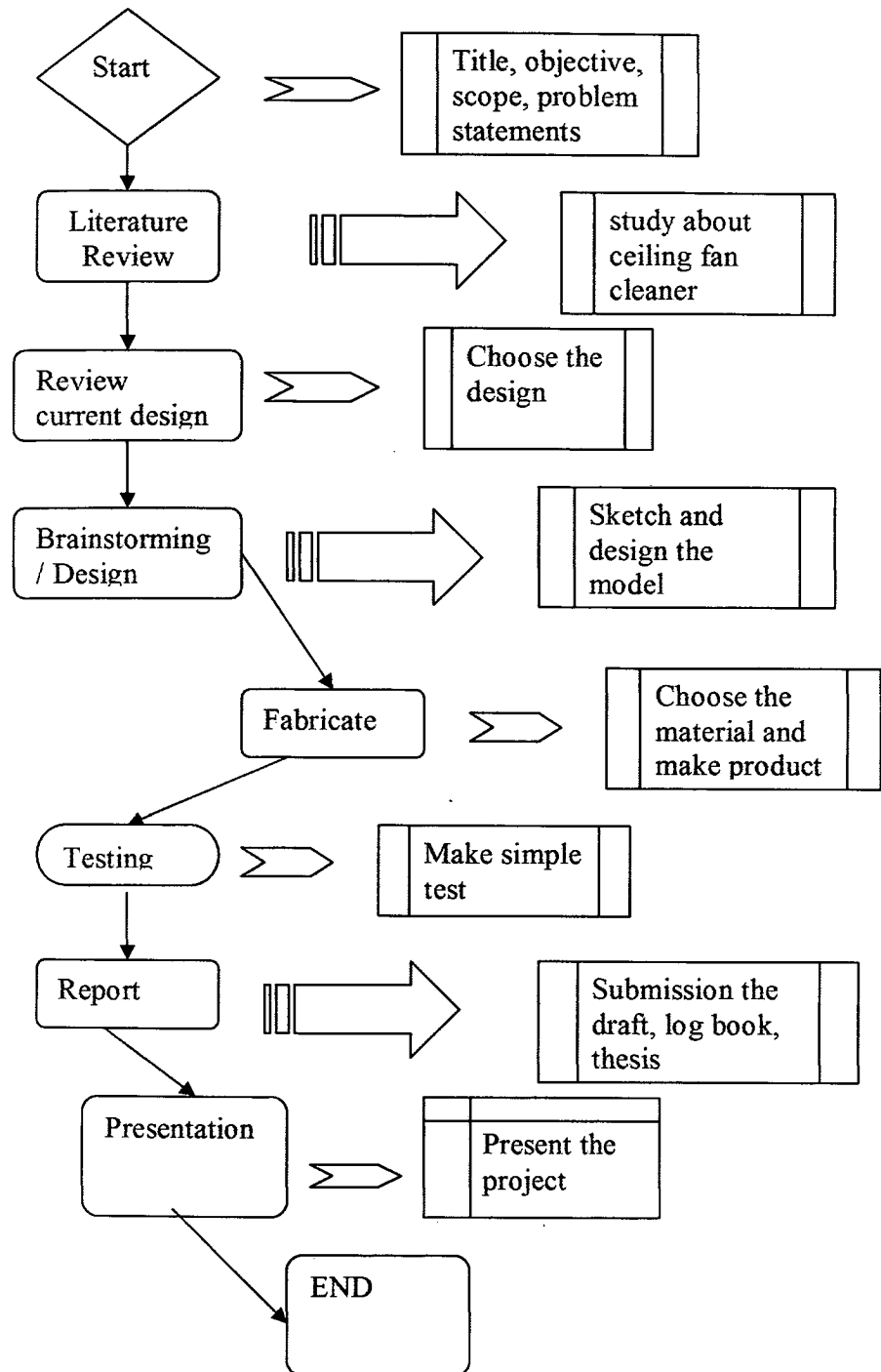


Figure 3.1 : Flow chart

From the diagram above, the project starts with literature review and research about the title. This consist a review of the concept of ceiling fan cleaner, the scope of project and also the problem statements. These tasks have been done through research on the internet, books and others sources.

After gathering all the relevant information, the project undergoes design process. In this step, from the knowledge gather from the review is use to make a sketch design that suitable for the project. After several design sketched, design consideration have been made and one design have been chosen. The selected design sketched is the transfer to solid modeling and engineering drawing using Solid Works program.

After the engineering drawing finished – include detail design and approved by supervisor, the drawing was used as a reference for the next process which is fabrication process. This process is consists fabricate the parts that have design before by following the dimension using various type of manufacturing process. The manufacturing process included in the process is cutting, drilling, roughing, and finishing surface. During the fabrication process, if there is something wrong occur such as not balance dimension so the process stop and go back to previous step, check the drawing back. For this project, the earlier design was changed when it go for fabrication process because the difficulty to fabricate using the available machine, the change of design around 30 % from earlier design.

After the fabrication process, comes testing process. The testing is to gathered information about strength, durability, crash safety, design that has been fabricated. The test process just to testing whether the instrument are functioning or not. If this ceiling fan cleaner is working, its will go through the next process that is report process. And if the ceiling fan cleaner is not working properly there should begun again with the design process.

After the process mentioned above is done. All the material for report writing is gathered. The report writing process will be guided by the KUKTEM final year project report writing. This process also included the presentation slide making for the final presentation of the project.

The project ended after the submission of the report and the slide presentation has been present.

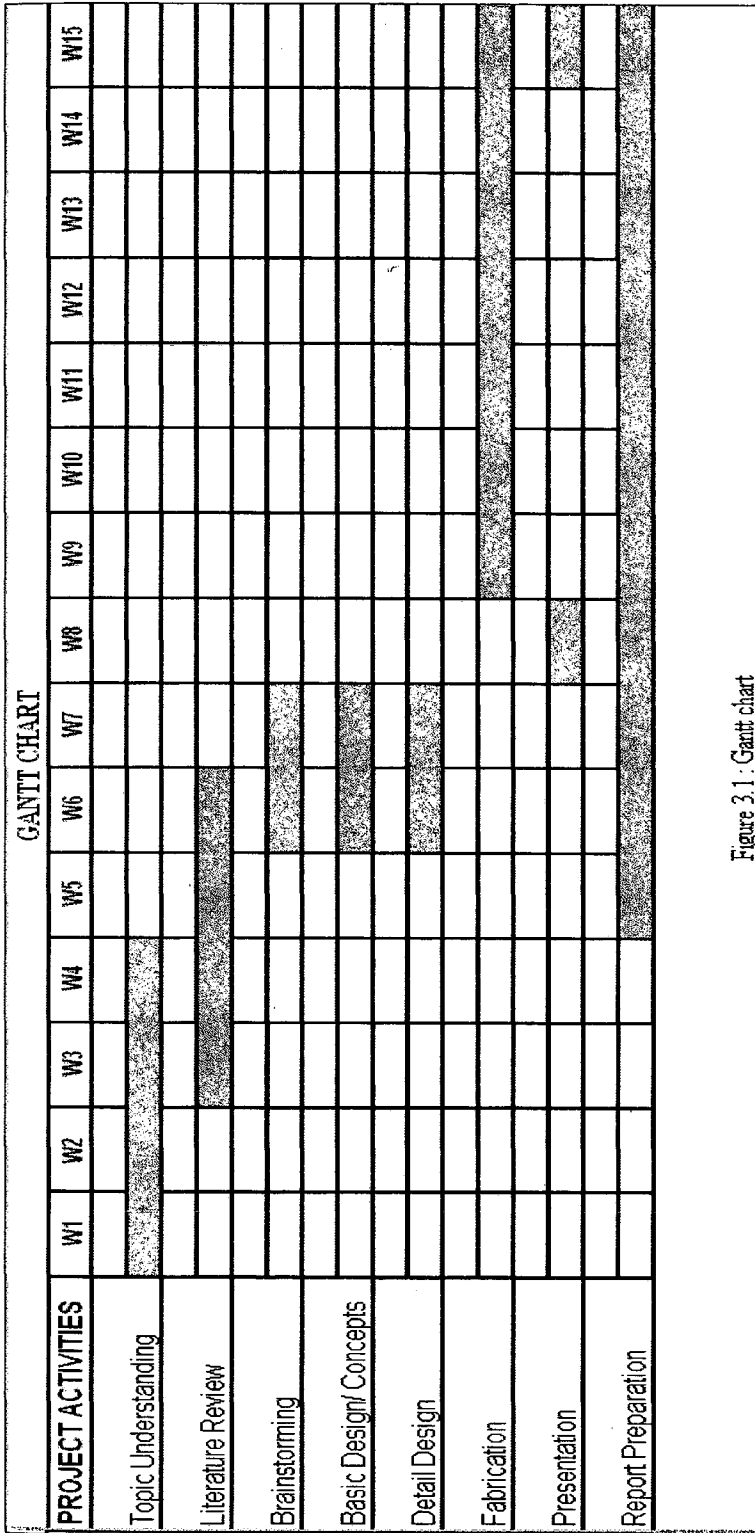


Figure 3.1 : Gantt chart

3.3 : Project Planning

This project is begun with made a research and search for information via internet, books, supervisor, and others relevant academic material that related to the title, this literature review takes about a week. The findings of information not stop there. It continues along the way of this project because knowledge is so many to learn.

At the same week have do schedule management for the project which included schedule management namely as Gantt chart (time management) and also flow chart (process management). This is done using Microsoft Office Excel using Gantt chart system. This also takes a week to accomplish.

The first week also had to arrangement several meeting with my supervisor to be clearly about the scope of title, synopsis from previous research and tool requirement which included software (Solid Work) or hardware (machining).

The second week, have to submit the project title acceptance form and continue research in literature review of current model of ceiling fan blade cleaner, the information was are more details on the design of ceiling fan cleaner and how it work and the research of information, its takes more from previous research which similarity with my project title, this takes a week to be done.

The title are well clear at week fifth, it consist of scope and objective for the project. At this week, the meeting with supervisor only focused to choose the right design which is suitable for use and to design.

At this week the sketch should finish with the right dimension and have to be approved by the supervisor. The engineering drawing was use SolidWork software